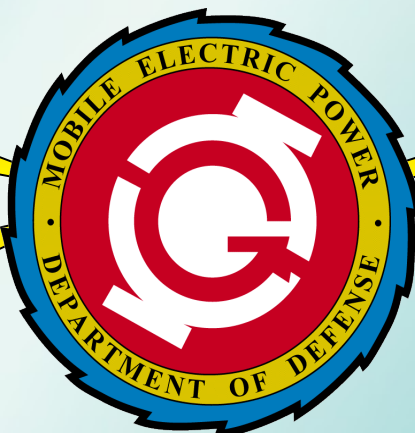


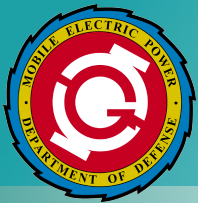
DOD Project Manager - Mobile Electric Power

Tactical Electric Power *DoD-Wide "Transformation"*

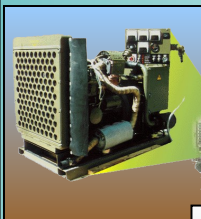


Tri-Service Power Expo
July 15-17, 2003

Colonel Mark Jones
Dr. James Cross
LtCol Bob McKenzie
Project Manager - Mobile Electric
Power



Presentation Outline



Who We Are and What We Do!



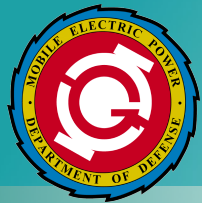
Current Operations



Future Operations



Questions and Feedback



PM MEP

Program Executive Officer

Combat Support &
Combat Service Support

Project Manager
Mobile Electric Power

Product Manager
Physical Security
Equipment

Product Manager
Test, Measurement &
Diagnostic Equipment

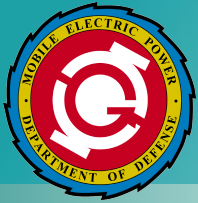
Product Manager
(USMC)
Small Power Sources

Product Manager *
(USA)
Medium Power Sources

Product Manager
(USAF)
Large Power Sources

DoD PM / Executive Agent
for
"Tactical Power"

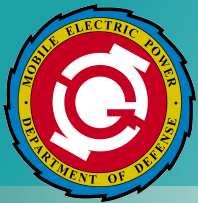
Provide a Modernized Department of Defense Standard Family of Mobile Electric Power Generating Sources for All Services For Maximum DOD Component Use. Accomplish this Mission Through a Coordinated Inter-Service Effort to Develop, Acquire, and Support Mobile Electric Power Sources from Small, 0.5kW Man portable Generators to Large, 920kW and Greater Prime Power Systems.



What is Tactical Electric Power?



TQG - Tactical Quiet Generator
 MTG - Military Tactical Generator
 PP - Power Plant
 DPGDS - Deployable Power Generation



Mobile Electric Power History



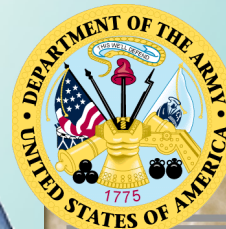
1965
Southeast Asia
Vietnam
Exorbitant Demand for Electric Power
Excessive Proliferation: 2,000 Different Makes, Models, Sizes
Ineffective Logistical Support

1967
DOD Ad Hoc Working Group Established

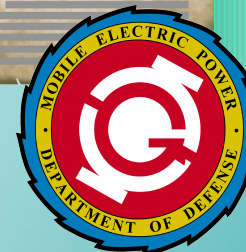
Developed
Established

DoDD 4120.11

"Establish, Maintain and Provide a DOD Standard Family of Generating Sources for Maximum DOD Component Use"
U.S. Army Designated as Lead Standardization



PM-MEP CHARTER



JOP
Joint Operating Procedures

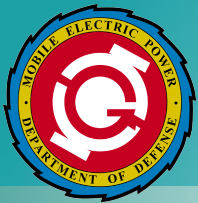
Joint Operating Procedures Management and Standardization of Mobile Electric Power Generating Sources

Army Regulation 700-101
AFJI 63-110
NAVFACINST 4120.12

DOD Project Manager - Mobile Electric Power

PM-MEP

AAE - Army Acquisition Executive
APU - Auxiliary Power Unit
ECCU - Environmental Control Control Unit
MCO 11310.8C
DLAI 4120.11



Military vs. Commercial

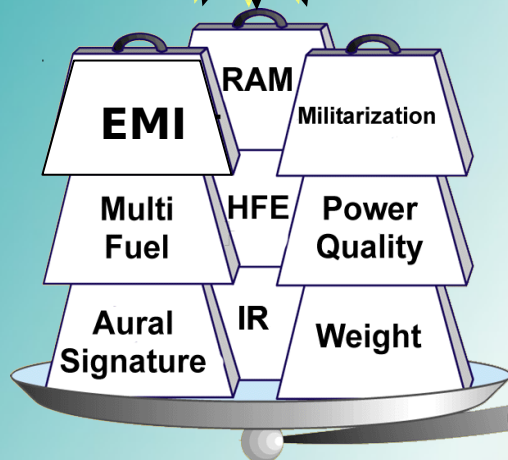


≠



Critical Military Features

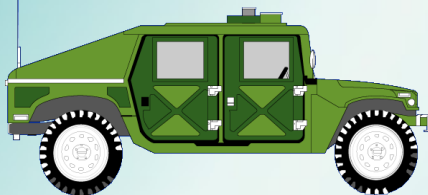
- Diesel/JP-8 (DoD Policy)
- 24 Volt
- Enhanced Battlefield Survivability
 - NBC
 - IR
 - Aural
 - EMP Hardening
- Operate at all Environmental Extremes
- Rated Power at Altitude
- Ruggedized
- High Reliability



Military

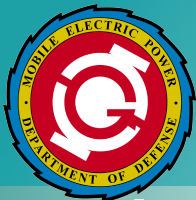
Capability

Commercial

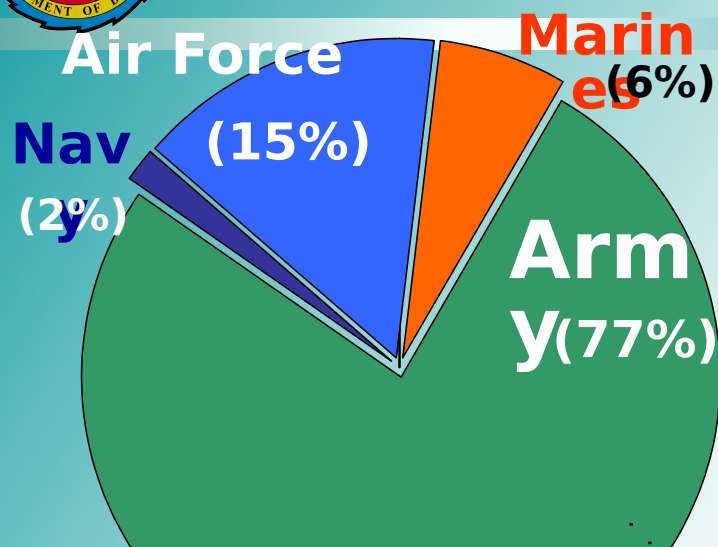


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Current Situation



2kW thru 920kW Generator Sets & APUs

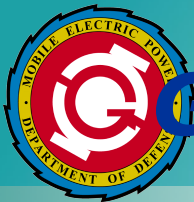
Requirements	Fielded	
	MIL-STD	TQG
Army 66,922	42,341	24,581
Navy 1,604	1,029	575
Air Force 3,340	6,148	7,192
Marines 5,358	2,698	2,660
Total 87,224	52,216	35,008

Data Thru Jul 03

% Size	Army	% Army	Qty
Size	# Req'd	Total	Fielded
Fielded			
2kW	7,623	11.4%	4,771
62.6%			
3kW	18,988	28.4%	2,054
10.8%			
5kW	13,832	20.7%	6,015
43.5%			
10kW	12,449	18.6%	5,984
48.1%			
15kW	4,383	6.6%	1,861
42.5%			
30kW	3,430	5.1%	1,690
49.3%			
60kW	2,848	4.3%	1,087
38.2%			
100/200	371	0.6%	0
0.0%			
DPGDS	42	0.0%	0
0.0%			
APUs	2,956	4.4%	1,119
38.4%			
MIL-STD = Military Standard	66,922		24,581
First Generation Gasoline and Diesel Engine Generator Sets			
TQG = Tactical Quiet Generator			
Second Generation, Modernized, Diesel Engine Generator Sets			

**News Flash: Two-Thirds
"Highly Digitized C4ISR" Force
... is powered by 1980's
Generators**

Transformation



Generators & Associated Equipment

Small Sets

- 2kW Military Tactical Generator, Manportable/Skid Mounted, Diesel/JP8 Fueled, AC(60Hz) and DC(28VDC)
- 3kW Tactical Quiet Generator, Skid Mounted, Diesel Fueled (60 Hz and 400Hz)



Medium Sets

- 5kW, 10kW, 15kW, 30kW, and 60kW, Skid Mounted, Diesel Fueled Tactical Quiet Generator, 60Hz and 400Hz



Large Sets

- 100kW and 200kW Tactical Quiet Generator (TQG), Skid Mounted, Diesel Fueled, 60Hz
- 920kW Deployable Power Generation and Distribution System (DPGDS), Diesel Fueled



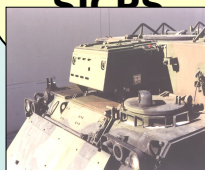
Power Units/Power Plant (PU/PP)

- Trailer Mounted Tactical Quiet Generators in the 3kW, 5kW, 10kW, 15kW, 30kW, 60kW, 100kW, and 200kW Power Ratings.
- 20 Different Models That Use 4 Different But Compatible Fuel Systems



Auxiliary Power Units (APUs)

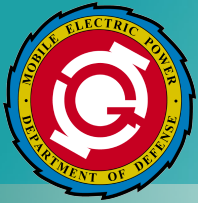
- 5kW 28 VDC APU for Use on M557
- 10kW Shelter- Mounted APU for use in Shelters such as SICRS



Power Management and Distribution System (PMDS)

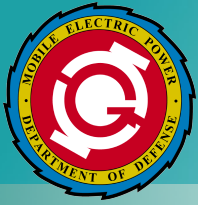
- Next Generation (PMDS) Man-portable, Reliable, Modular, Quick Assembly Standardized Electrical Management and Distribution System Components
- 100 AMP/PHASE FEEDER SYSTEM
- 200 AMP/PHASE FEEDER SYSTEM
- UTILITY RECEPTACLE AND LIGHTING KIT





Current Contracts

<u>Item</u>	<u>Purpose</u>	<u>Contract Type</u>	<u>Awardee</u>	<u>Date</u>
2kW MTG	Re-procurement	FFP/IDIQ	Dewey Electronics	Sep 01
3kW TQG	Re-procurement	FFP/IDIQ	Fermont (ESSI)	Jul 01
30 & 60kW TQG	Re-procurement	FFP/IDIQ	MC II	Sep 01
100 & 200kW TQG	Re-procurement	CP (Phase II)	Fermont (ESSI)	Jun 01
10kW APU	Development	(FFP)	Chenega	Feb 03
	Re-procurement			



How do I get Generators?

Army



- **Programmed Total Package Fielding**
- **MISER (Materiel Integration and Systems Evaluation Review)**
(Formerly “Data Interchange”)

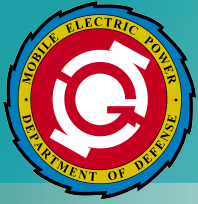
- **Customer Funded**

Other Services POCs

**USN: Commander, Navy Facilities Engineering
Center**



**ATTN: NAVFAC Code 0-641
200 Stovall Street
Alexandria, VA 22332**



How do I get Generators?

Other Services POCs

USAF: Mrs. Lisa Hosecloth



Program Mgr, Ground Generators, Robins AFB

**DSN: 468-7603, x283; Comm (478) 926-
03, x283**

E-mail: lisa.hosecloth@robins.af.mil

USMC: GYSGT Al Shaw

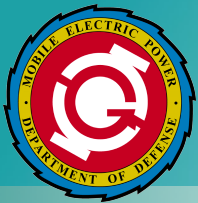


Program Mgr, Expeditionary Power Systems

MARCORSYSCOM, Quantico

DSN: 378-3613; Comm (703) 432-3532

E-mail: shawae@mcsc.usmc.mil



Standardization Policy

DoDD

4120.11

- **Contains the DoD Guidance and**

Policies Related to the Development, Standardization, and Use of Mobile Electric Power Generating Sources

- **Simply Stated, it Requires that all DoD**

Components Will Use the DoD Standard Family of Generator Sets



Department of Defense DIRECTIVE

NUMBER 4120.11

July 9, 1993

A.SD(P&L)

SUBJECT: Standardization of Mobile Electric Power (MEP) Generating Sources

References: (a) DoD Directive 4120.11, "Standardization of Mobile Electric Power Generating Sources," November 19, 1979 (hereby canceled)
(b) DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991
(c) MIL-STD-633, "Mobile Electric Power Engine Generator Standard Family Characteristics Data Sheet," February 22, 1980
(d) MIL-STD-1332, "Definitions of Tactical, Prime, Precise, and Utility Terminologies for Classification of the DoD Mobile Electric Power Engine Generator Set Family," March 13, 1973
(e) through (g), see enclosure 1

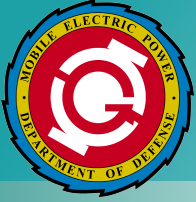
1. REISSUANCE AND PURPOSE

This Directive reissues reference (a) to update policy and responsibilities for the acquisition of DoD MEP generating sources, and establishes the position of the DoD Project Manager for MEP (PM-MEP).

2. APPLICABILITY AND SCOPE

This Directive:

2.1. Applies to the Office of the Secretary of Defense, the Military Departments, the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Unified and Specified Commands, the Defense Agencies, and the DoD Field Activities (hereafter referred to collectively as "the DoD Components").



How do I Request a Waiver?

- **Submit Letter to PM-MEP**

- **Details Provided in APPENDIX C of the "JOP"**

Find a copy of the JOP on Our Web Site Under "Reference"

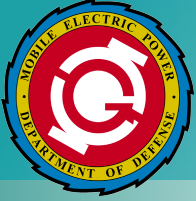
www.pm-mep.army.mil

**Army Regulation 700-101
AFJI 63-110
NAVFACINST 4120.12
MCO 11310.8C
DLAI 4120.11**

Logistics

**Joint Operating Procedures
Management and Standardization
Of Mobile Electric Power
Generating Sources**

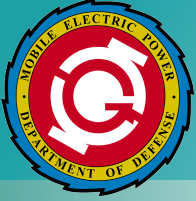
Headquarters
Department of the Army, the
Navy, The Air Force, and the
Marine Corps and Defense
Logistics Agency
Washington, DC
29 November 1999



What is a Systems Assessment?

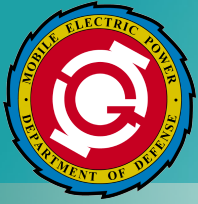
- **Evaluation of System Power Requirements in an Operational Environment.**
- **Determines Optimum Size and/or Mix of Sizes of Generators to Support System.**
- **Recommended for:**
 - **Tactical Operations Center Re-organizations**
 - **Unit Re-organizations**
 - **Program Offices Developing New Systems**

“Right Size” Your Power Source!



Who pays for the Systems Assessment?

- **If your system's generator is a separate Army authorized item on the TOE/TDA, PM-MEP will normally fund the Assessment.**
- **If your system's generator is a component of a system, then that system's Project Office will normally fund the Assessment.**
- **If you are a Service other than Army, you will normally fund the Assessment.**

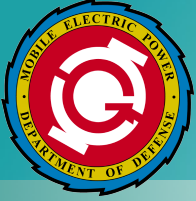


How do I get a Systems Assessment?

Point of Contact

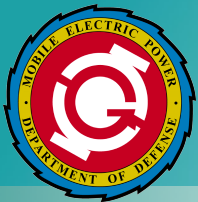
**Power Generation Branch
Army Power Division
CECOM RDEC
10108 Gridley Road
Fort Belvoir, VA 22060-
5817**

**DSN 654-2357
Com 703 704-2357**



Recent Lessons Learned / Issues

- **Sand in generator switches**
- **3kW TQG A-8 Inverter Modules**
- **2kW MTG & 3kW TQG Starters**
- **Need for a 1-2kW APU**



Transformation Strategy

MIL-STD Fielding

TQG Fielding

**Execute Specific
Near-Term Efforts....**

Force Structure

**Under-the-Hood
Power**

AMMPS

**...While we leverage realistic
deliverables from Industry's
Leap-ahead" Technologies**

**Future Power
Systems ***

* Future Power Sources - Beginning with small APUs operating on Methanol or Hydrogen, and leading to larger power sources that run on either JP-8 or ** Advanced Medium Mobile Power Sources Hydrogen + Hydrogen-based Infrastructure

1970

1980

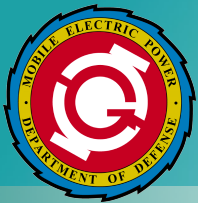
1990

2000

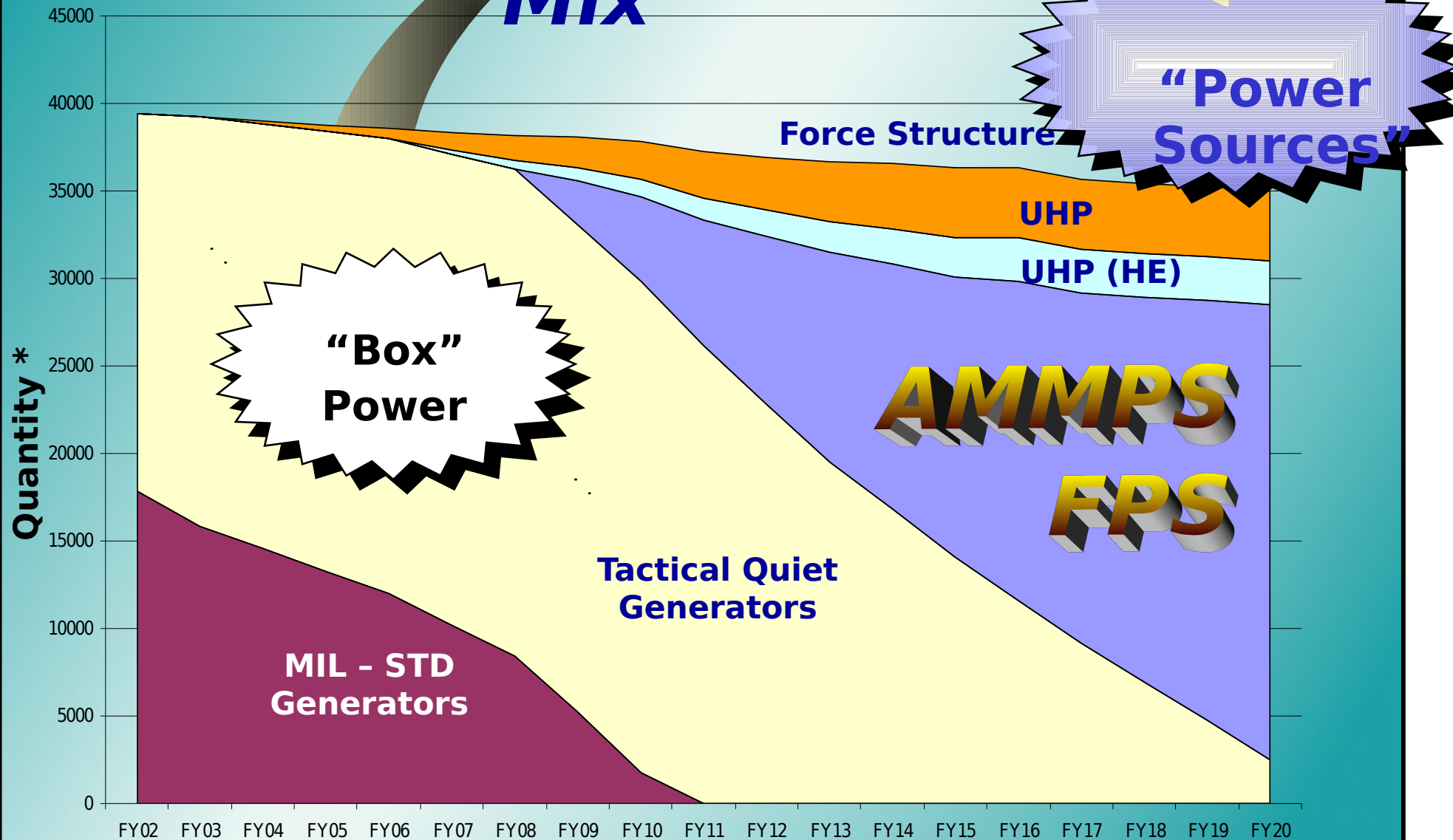
2010

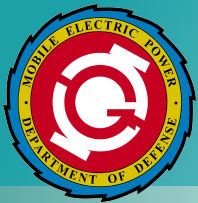
2020

2030



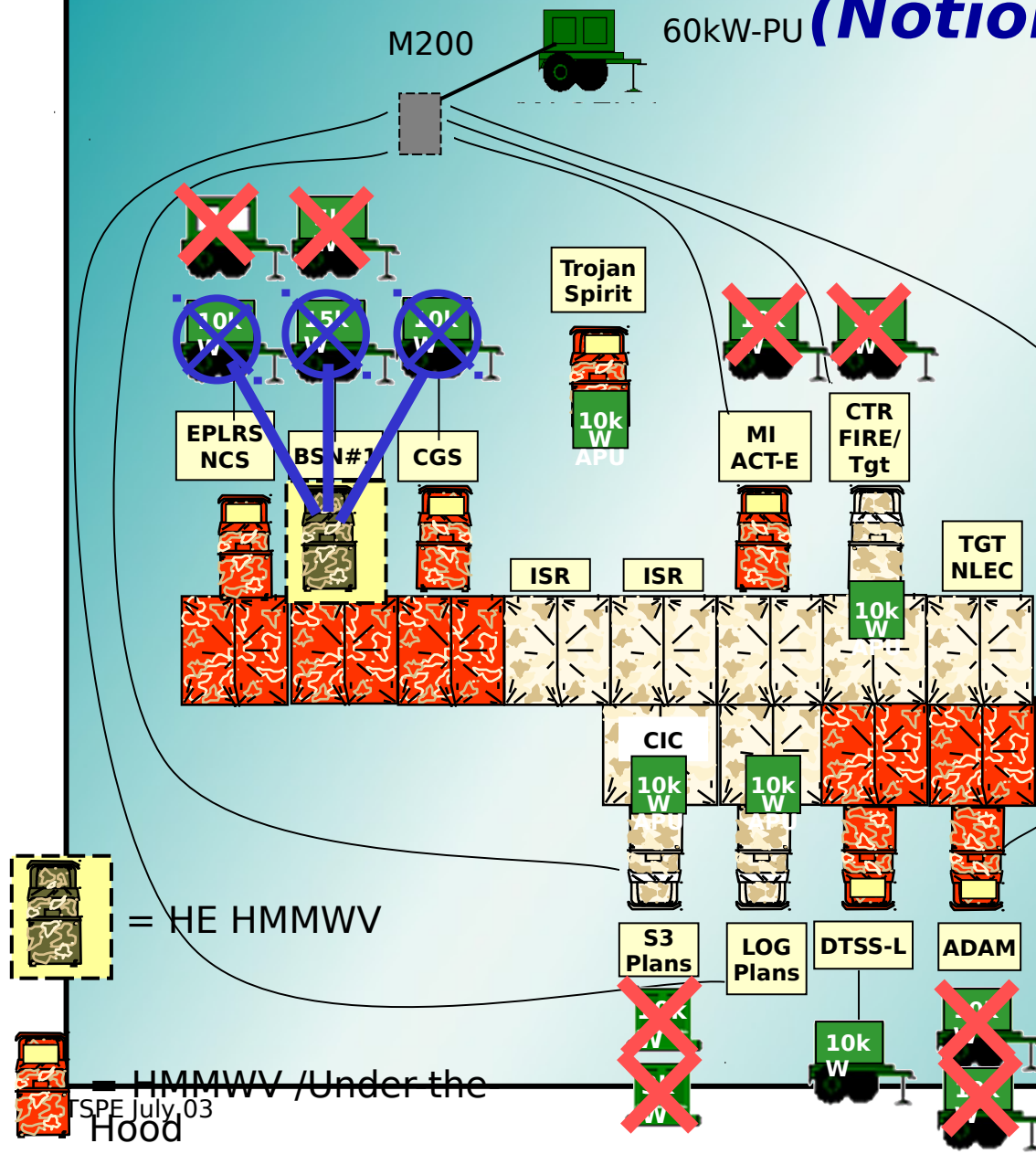
Transformation "Mix"





Force Structure Transformation

(Notional)



BDE Main TOC

• Power Capacity
115.0 kW

• Power Required ~~8~~ ~ 6
93.3kW

- Key Points
- Gen Sets & APUs

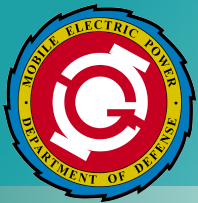
16 ✓ Reduced footprint

✓ **Reduced Fuel**

✓ **Much easier to maintain**

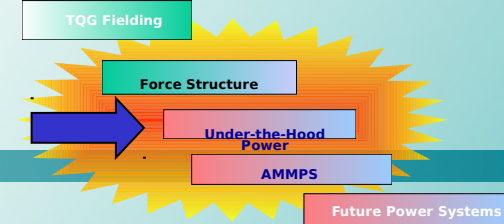
✓ **APUs - Backup power only**

✓ Redundancy = $\frac{36\%}{57\%} = 100\%$

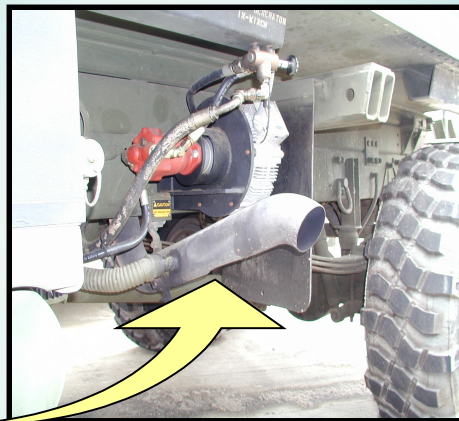
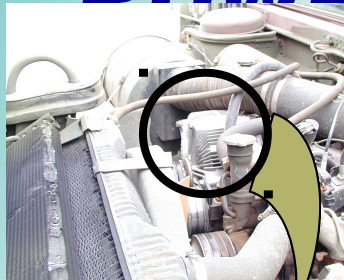


MIL-STD Fielding

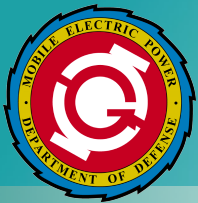
TQG Fielding



Under-the-Hood Power



- **Use Existing Vehicle Engine to Produce Exportable (AC) Power**
- **Basic Components: Large Alternator + Power Electronics**
- **Power: 3kW - 10kW**
- **Cost: ~\$7K (GSA Catalog / 5kW)**
- **Greatest Potential: Backup Power, Specialized Applications**
- **Limited Potential: Primary Power**



Under-the-Hood Power

(Hybrid Electric)

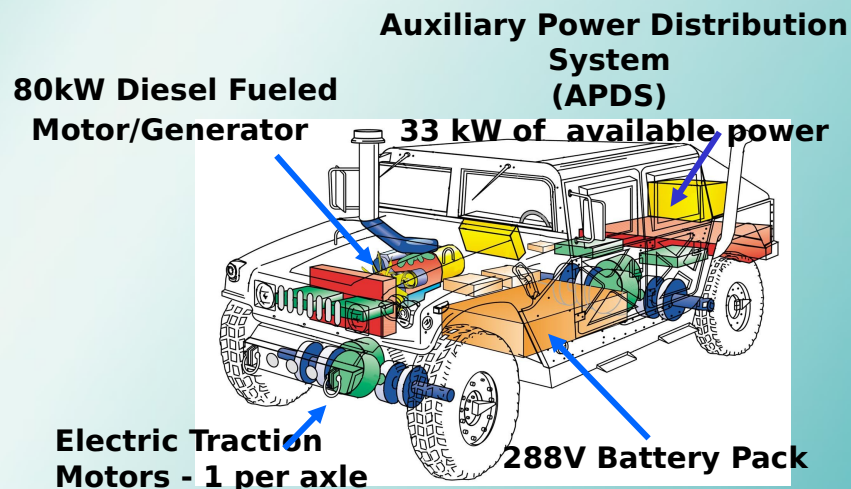
Key Requirements

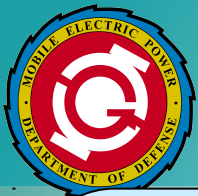
- ***Decrease fuel consumption: 10-30%***
- ***10kW-50kW of continuous power ****
- ***C130 Transportability***
 - Silent Mobility
 - Silent Watch
 - Multi-phase mobile power (AC/DC)
 - Maintain HMMWV Requirements

* Draft ORD Block II Requirement, Prototype - 33kW

Key Events

- ***User Informal Eval - 3/4Q FY03***
- ***APDS Testing - Aug 03***

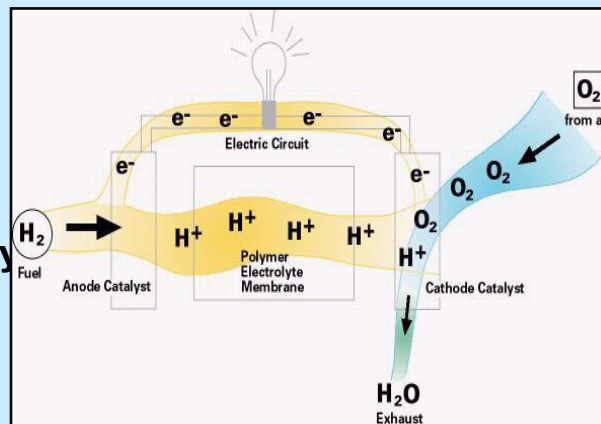




Fuel Cells

Potential Advantages

- Reduced energy dependency
- **Increased efficiency**
- Reduced emissions
- Silent (less reformers)
- Size/weight (less reformers)



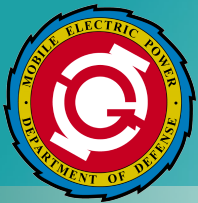
Technical Issues

- **Logistic Fuel Reformation**
- Start up times - 10-30 min
- Water management
- System vs. Stack Efficiency
- Poisoning (Sulfur, etc.)

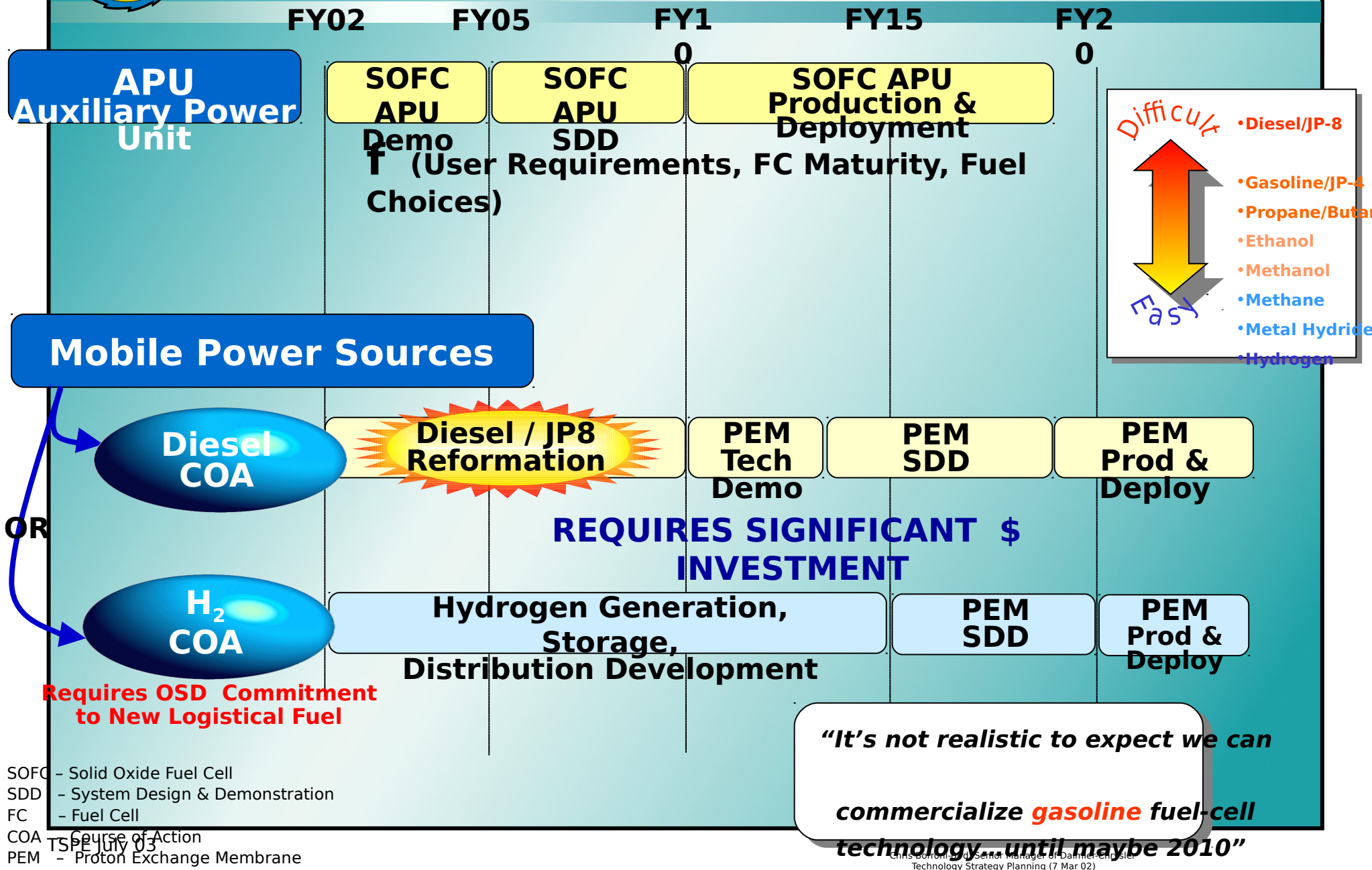


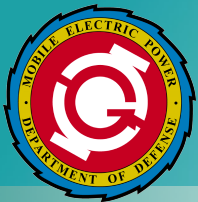
Bottom line

- **Marketing ~~X~~ Reality**
- **Industry Focus - Not on JP8**
- **Cost - 10 times ICE Power**
- **Stack advances vs. ICE advances**
- **1-N "Stovepipe" DoD Efforts**
- **Commercial Market Penetration**
- **- 2015***



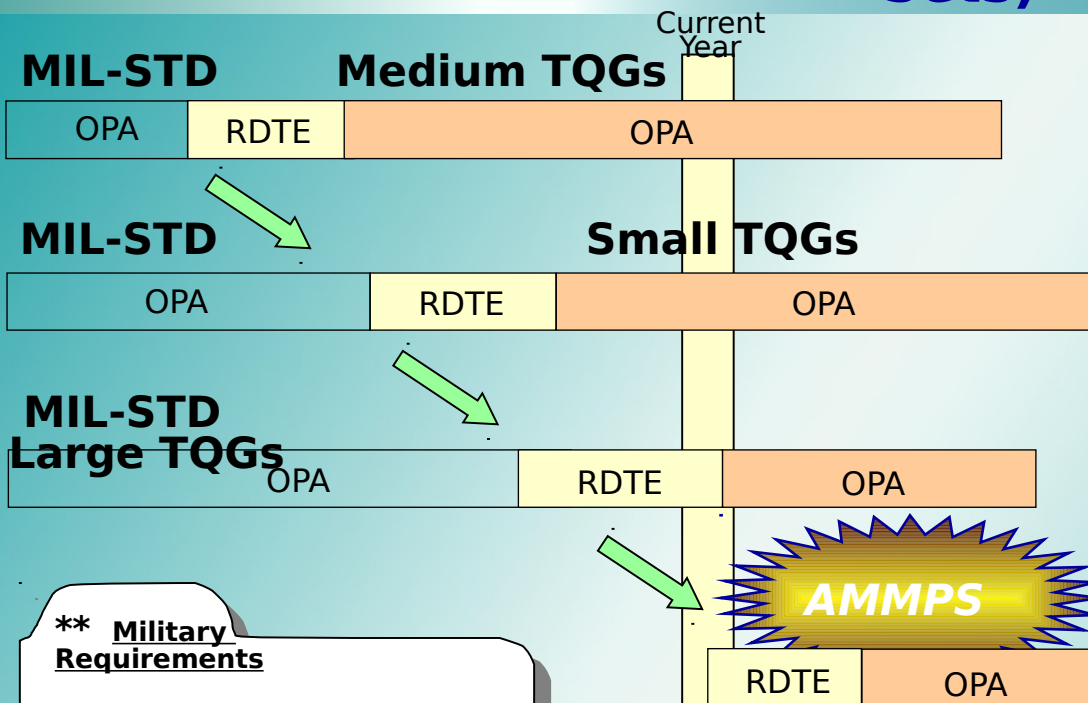
Fuel Cells - DOD Potential Roadmap





AMMPS

(DoD Acquisition Strategy - Gen Sets)



** Military Requirements

- MIL-STD 1332 Power Quality
- Trailer and Skid Mounted
- NBC Survivability
- EMI & HAEMP Survivability
- Low Acoustic & IR Signatures
- All-weather Operations
- C-130 Transportable

Acquisition Strategy based on Requirements + Funding is to:

- Develop & Field Power Capabilities using Phased Approach
Med—Small—Large
- Leverage Commercial Technologies
- Maximize competition to meet Military unique requirements **
- Replace generator sets ~17 years
- Cascade new assets to Lower Priority Units as new capabilities are fielded

MIL-STD = Military Standard

(First Generation Gasoline and Diesel Engine Generator Sets)

TQG = Tactical Quiet Generator

(Second Generation, Modernized, Diesel Engine Generator Sets)

1990

1995

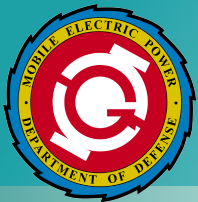
2000

2005

2010

2015

2020



AMMPS vs TEP ORD

2kW



3kW



Small Power Sources

5kW



10kW



15kW



30kW



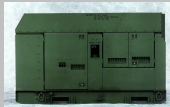
60kW



**Advanced
Medium Mobile
Power Sources
(AMMPS)**

TEP ORD
(0.5 to 200 kW)

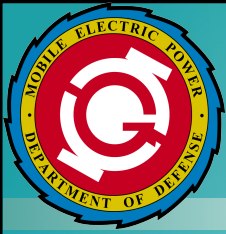
100kW/200kW



DPGDS (920kW)



**Large Power
Sources**



AMMPS Requirements

PERFORMANCE is the
Key

Thresholds

- Compared to TQG

10% Lighter
15% More Fuel Efficient
3 dBA Quieter
20% More Reliable
EPA Compliant

AMMPS
Advanced Medium
Mobile Power
Sources

Potential Technologies

- **High Speed Diesel Engine**
- **Permanent Magnet Alternator**
- **Power Electronics**
- **Digital Controls**
- **Composite Materials**
- **Other Technologies**

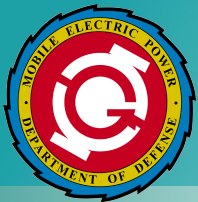
Objectives

- Compared to TQG

25% Lighter
25% More Fuel Efficient
6 dBA Quieter
50% More Reliable
EPA Compliant

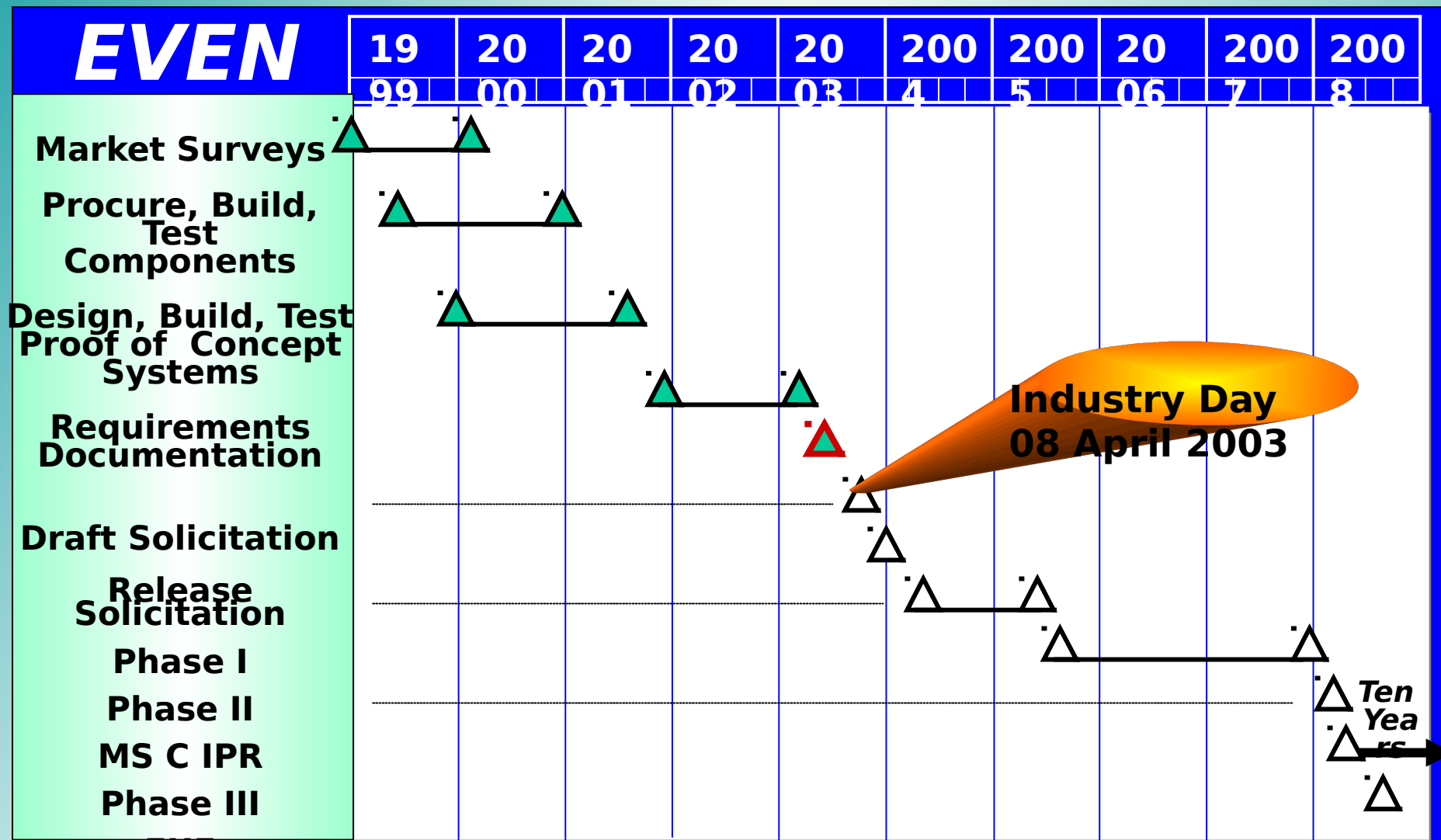
**Future
Power**

? Microturbine
Engine



AMMPS Schedule (Draft)

Calendar Years



FUE

* ORNL - Oak Ridge National Lab



Take Aways

- **We NEED Your Feedback**

- **Operation Iraqi Freedom**
- **Other Operations**

- **AMMPS**

- **On Schedule / Funded**
- **Draft Solicitation to be Released Aug 2003**

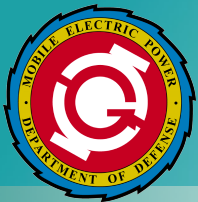
- **Assessments Critical for**

Units and Systems

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- **Technical Assistance**
- **Assessments**
- **Hardware**



Information / Points of Contact

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DSN: 654-3162

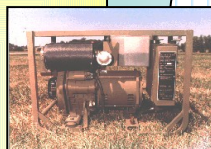
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